

Chesapeake and Ohio Canal: McCoy's Ferry Road Culvert
On McCoy's Ferry Access Road underneath the C & O Canal and
towpath, 110.42 miles from the eastern terminus of the
C & O Canal National Park
Big Spring Vicinity
Washington County
Maryland

HAER No. MD-71

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PHOTOGRAPHS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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HISTORIC AMERICAN ENGINEERING RECORD

CHESAPEAKE AND OHIO CANAL: MCCOY'S FERRY ROAD CULVERT

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Location: Chesapeake and Ohio National Historical Park, on McCoy's Ferry Access Road underneath the C & O Canal and towpath, 110.42 miles from the eastern terminus. Big Spring vicinity, Washington County, Maryland.

UTM: 18/245000/4388380
Quad: Hedgesville, West Virginia

Date of Construction: 1835-1840

Builder: James J. McElhey

Present Owner: National Capital Park Region
National Park Service

Present Use: Vehicular traffic underneath former canal and towpath.

Significance: This structure typifies road culverts which were utilized to cross underneath the canal, towpath and berm bank to farmlands between the river and canal and/or river crossings. Culvert No. 142 (McCoy's Ferry) provided access to an important river crossing at this location. In form, the culvert embodies "specifications" that were used to construct culverts by the canal company. This culvert has retained its original intention of a vehicular road culvert and is utilized by the park.

Historian: Mary Kendall Shipe, 1988

The Chesapeake and Ohio Canal dates from 1825 when it was chartered to provide a commercial connection between the eastern market and the trans-Allegheny West by means of the Chesapeake Bay and Ohio River via the Potomac River. The oldest (eastern) portion of the canal operated from 1831 to 1924. The U.S. Government acquired the canal in 1938, and it was given National Register status by the 1970s.¹

Today, the Chesapeake and Ohio Canal National Historical Park offers an abundance of masonry structures that are valuable historic resources as a collective whole and as individual structures. Masonry predominates the physical appearance of the park and has been referred to as "the glory of the canal."² Over 150 of these masonry structures are culverts. Culverts were necessary to the proper functioning of the canal as they facilitated inland drainage to the Potomac River under the canal, berm bank and towpath bank. The C & O Canal Company employed the use of contractors and its own corps of engineers for the construction of culverts. The major building phase for culverts was between 1832 and 1850. The construction of the culverts was based on predetermined specifications that outlined measurements, materials and methods which were formulated before canal construction from 1829 to 1832.³

A primary aspect of culvert construction involved the use of a timber foundation for the masonry when a rock foundation was not available on the site. Most structures did require a timber foundation. Culverts were formed from two parallel vertical stone walls that were connected by a masonry arch. Stone was considered the best material for an arch, but brick was also utilized. The presence of a keystone on the masonry arches was indicative of a canal-built structure.⁴ The bank surrounding the culvert was held in place with a retaining (or face) wall further supplemented by wingwalls. The size of the culvert opening depended on the amount of drainage that was expected to run through the culvert. The masonry composition of the culverts guaranteed solidity and durability and contributed to a lengthy life span for the structures. In contrast to other masonry structures along the canal (aqueducts, lockhouses and portals, for example), culverts were easily constructed and less complicated from an engineering standpoint. Aesthetically, however, culverts were given equal attention compared to other

¹ For further information on C & O Canal history, see Walter Sanderlin, The Great National Project (Baltimore: The Johns Hopkins Press, 1946).

² Elizabeth Kytle, Home on the Canal (Cabin John, Md.: Seven Locks Press, 1983), p. 80.

³ Kytle, p. 64.

⁴ (Bridges: Our Legacy in Stone, The Washington County Museum of Fine Arts, September 1965, entry 19.)

masonry structures, as evidenced by the architectural treatment of culvert face walls in which stone texture was often varied to add "visual enhancement".⁵ Thus, masonry culverts are representative of masonry construction along the canal in general and the thoughts of permanence that lay behind the usage of masonry.

Although the typical culvert seen on the canal was the culvert used for inland drainage, it was also necessary to construct road culverts. At points along the canal, there were gaps of land between the river and the canal. Generally, this land was under cultivation or used for grazing. A vehicular culvert provided access to these lands for farmers. This use of a culvert was allowed as it preserved the embankment and was not too costly.⁶ The President of the Canal also ordered the placement of vehicular culverts at places on the river where communication between states via the Potomac River was easily made. At a number of locations, ferry boat landings had already been established for the exchange of goods. The order from the canal president called for culverts at these locations that were "made of such breadth and elevation as to admit the passage of horsemen and laden wagons and carriages beneath the canal."⁷

The McCoy's Ferry Road Culvert helps to illustrate the early history of the canal by its placement at a prime river crossing. In 1835, the Canal Commission accepted a proposal from James J. McElhey, for the masonry construction of Culvert No. 142 (McCoy's Ferry Road Culvert).⁸ The proposal called for the completion of the masonry work by the fall of 1836.⁹ The Chief Engineer of the Canal ordered a twelve foot span road culvert for the site because of an established ferry on the riverfront. The location on the river provided a strategic crossing during the Civil War. In 1861, Confederates attempted unsuccessfully to capture the ferry which resulted in a small skirmish. Later, in 1862, J.E.B. Stuart's Confederate calvary crossed into Maryland at this location.¹⁰

The McCoy's Ferry Road Culvert is a typical road culvert along the canal

⁵ National Capital Park Region, National Register Nomination: "C & O Canal National Historical Park," August 1979, p. 3.

⁶ Harlan Unrau, Historic Structure Report: The Culverts (Denver Service Center, National Park Service, 1976), p. 16.

⁷ Unrau, p. 16.

⁸ Original documents of the canal specify numbers in reference to the culverts. (Unrau, p. 38, 40-43)

⁹ Unrau, p.38.

¹⁰ Hiker's Guide to the C & O Canal, Baltimore Area Council: Boy Scouts of America, 1970, p. 33.

in its representation of the specifications for culverts. These specifications included such features as a stone arch design with a keystone, a timber foundation if stone was not available and well-cut ringstones. A cost estimate of the culvert, which was constructed by 1840, counted 695 perches (measurement for stone) at \$3.75 per perch which totaled \$2,606.25.¹¹ As described in detail in the Classified Structure Field Inventory Report¹², Culvert No. 142 is a large culvert of random laid limestone with a twelve foot wide opening, a seven foot vertical wall to springstone and a four foot low arch rise. The face (or retaining) wall on both sides measures seven feet from the arch to the top coping stones; the coping stones measure fifteen inches in height. The inflow (berm) entrance to the culvert is flanked by full height, rectangular buttresses with slightly canted walls that measure five feet by ten feet and stand out two feet from the culvert opening. The keystone of the arch on this side is protruding. In 1906, the outflow (river) side was replaced with concrete, extending fifteen feet into the culvert. This side's concrete wingwalls are placed at a sixty degree angle and taper down at a thirty degree slope from the top coping. Historically, this culvert signifies the first known use of the macadam paving process for a culvert.¹³

Although the ferry is no longer in operation, the culvert has retained its original function as a vehicular culvert and serves today as an access road to McCoy's camping area in the park. The culvert stands as one of the few remaining road culverts currently in use along the canal.

¹¹ Unrau, Appendix C.

¹² The description herein is heavily based on the detailed description in the Classified Structure Field Inventory Report, Structure No. 50-10. (National Capital Park Region, Classified Structure Field Inventory Reports: C&O Canal [Washington, D.C.: National Park Service, 1976])

¹³ The Chief Engineer received a report in October, 1937, that Culvert No. 142 was paved with macadam rather than standard paving. (Unrau, p. 46.)

Supplementary Materials (taken from Unrau, Appendix A):

"Specifications for Culverts on the Chesapeake and Ohio Canal"
(ca. 1829)

The Culverts below Harper's Ferry will be about 110 feet long, and those above that point about 100 feet long; but the length will be varied according to circumstances.

The pits and foundations will be excavated of such width and depth as the Superintendent Engineer may direct; and no foundation shall be built upon until he or the Superintendent of Masonry shall inspect and approve it.

When practicable the Culverts will be founded on rock; when this cannot be done, the Engineer may require the foundations of all the walls, as well as the span or water way, to be made firm by paving the same with suitable stone, large and small, well rammed and driven, in which case, the first course of wall on such foundation shall be laid with large flags or stone having broad beds, laid in header form, and bound at the ends. Or foundations of timber may be required by the Engineer, made in the following manner, viz: timbers of suitable size, hewed on two sides, shall be laid one foot apart, and extending under the Culvert and its walls, and to the depth of four feet below the bottom of the aforesaid timbers. These timbers shall be first puddled between and level with their upper surface; and their whole extent shall be floored over with a course of jointed two inch yellow plank, and each plank secured to the timber by at least six locust pins, eight inches long and one and a quarter inches square. On this foundation the walls of the Culvert will be erected.

For all Culverts of four feet span, the arch shall be fourteen inches thick; six feet span, sixteen inches, eight feet span, eighteen inches; twelve feet span, twenty one inches; and sixteen feet span, twenty four inches thick; the space for puddle over the arch generally two and a half feet deep. The arches shall be semi-circular, or the segment of a circular, as may be required. The sheeting stones shall have good parallel pads, and fair joints, dressed with the hammer, and of a proper length to form a good bond. They shall also be of an equal depth, and the extrados of the arch hammered off smooth.

The ring stones shall be well cut and shaped, so as to form joints radiating from the centre. Those for a culvert of four feet span, shall be twelve inches deep; those for six feet span, sixteen inches; those for twelve feet span, eighteen inches; and those for sixteen feet span, twenty inches. They shall form a good bond with the arch, for which purpose, those for a four foot span must run alternately in the arch, from twelve to fifteen inches, and from twenty-four to thirty inches long. For any arch of greater size there must be alternately from fifteen to twenty inches, and from thirty to forty inches long. The ring stones are to be rusticated one inch, which rustic is to project or be in relief, one inch from the parapets and wings.

The abutments to be of such thickness as will be hereafter directed, to bear a proper proportion to their height, or large stones, well laid in rubble form, except the corners, which must be cut and counted to conform with the ring stones and wings.

The key stones shall be well shaped, hard, and of durable quality, and shall be accurately driven by a wooden mallet before the centres are removed.

The wing walls and parapets to be of hammered range work, to be well bedded and jointed stones, with a due proportion of heads; the whole to be surmounted with a well cut coping, eight inches thick, two feet wide, to project four inches over the face of the wall, unless a water table, is preferred by the Engineer. The whole work to be well laid in cement and grouted, with at least three bushels of cement to the perch. When the case will permit the abutments to be at least two feet high.

When the culvert has been, in other respects, finished, the outer surface of the arch shall be plastered half an inch thick with cement mortar.

The centres shall be constructed in such manner as the Engineer may prescribe.

The cement used must be of the best quality which the upper country will afford, to be approved by the Superintending Engineer, and shall be transported from the mill to the works, and preserved there until used, in such manner as the Engineer may in writing direct. The sand must be clean and sharp, and if not found naturally combining these qualities, it must be washed. No materials shall be used, until they are so approved.

The plan of the masonry, and of its foundation, shall be furnished each Contractor, and if any explanations are necessary, they shall be given by the Engineer of Superintendent of masonry, at all times when required.

Any stone excavated from the culvert pit, if approved by the Engineer, may be used in the construction of the culvert, but the surplus material excavated, shall be deposited at any place the Engineer may direct within the distance of 120 feet from the pit.

Where stone may be required for the construction of the Culvert, and the Contractor cannot agree with owner thereof for the same on reasonable terms, the President and Directors will upon application, cause the same to be condemned according to the Charter of the Company, the contractor paying the expense of the condemnation, as well as the sum awarded by Jury, for the stone.

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